not be of immediate necessity in the conservative lines of astronomical inquiry.

DAVID P. TODD.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

A method for determining the unit of light.

IN all photometric work hitherto undertaken, one of the main difficulties has been to obtain a satisfactory standard of light, — one which will be always constant, and which can be accurately duplicated. Heretofore, all experiments in this direction have been failures. The plan here suggested contemplates, not the employment of a unit quantity of light, but the employment of a certain effect produced by that unit quantity as a standard. In other words, it makes not the light, but the photometer, the constant.

This photometer must, then, be some device for measuring radiant energy. But, for photometric purposes, we wish only to measure that portion of the energy which has a wave-length readily visible to the human eye. With the great differences in color of our modern sources of illumination, it is absolutely impossible to state an exact equivalence between the yellow light of a candle-flame, and the blue light of an electric arc. For really accurate work, we can compare only light rays of the same wave-length. As the human eye is most sensitive to light from that portion of the spectrum between the *D* and *E* lines, in the following plan I have selected that region of the spectrum to be used exclusively for the comparison of the brilliancy of the various lights. In all probability, the total brilliancy of an incandescent body does not increase in a ratio exactly proportional to the increase in brilliancy of the yellow rays; but this difference, within practicable limits, is probably so small as to be entirely negligable. And we have the advantage of being able to state an accurate arithmetical ratio between the lights, instead of what must be at best a mere general comparison of the relative effect of the two lights upon our eyes.

Briefly stated, then, the method I would suggest consists in moving the light to be measured towards the slit of a spectroscope, until a certain effect is produced upon a screen so placed as to receive the yellow rays. When this effect is produced, the spectroscope is receiving the standard amount of light from the source; and the brilliancy of the source can then be determined by measuring its distance from the slit.

In attempting to apply this method, the difficulty which at first arises is, to obtain an effect which can be measured with accuracy. By permitting the spectrum of a light to fall upon suitable screens, three classes of effects may be obtained; namely, heating, visual, and chemical. Of these, the second is evidently unsuited for the purpose of obtaining a standard. The third is too uncertain, and not susceptible of sufficient accuracy, so that the first alone remains. Of the two practicable heat methods of measuring radiant energy, the thermopile is the more sensitive; but the bolometer responds the quicker to changes of temperature, and has the narrower surface. The latter instrument has, therefore, been selected for this application of the method. The unexposed arm of the bolometer has a slight additional adjustable resistance thrown into its circuit, so that, when the instrument is not in use, the needle of the galvonometer will have a certain deflection dependent on the strength of the battery-current employed. When the light to be measured is placed in front of the slit of the spectroscope (which should be quite broad), the deflection will be diminished. As the light approaches the slit, the deflection will decrease, and finally become zero, at which time it is giving out the standard light. Its brilliancy can now be read off from its position upon a scale placed in front of the slit and parallel to the collimator.

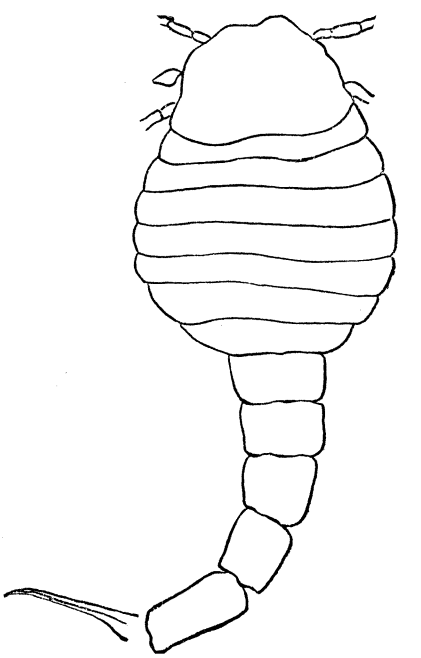
This photometer might also be used to adjust the position at which an incandescent electric or other lamp should be placed in order to furnish a constant supply of light. This source could then be used as a unit in an ordinary photometer.

WM. H. PICKERING.

An American Silurian scorpion.

The 'American scorpion' from the water-lime group of New-York State, described by Professor Whitfield on pp. 87, 88, is undoubtedly a young specimen of Eusarcus scorpionis (Grote and Pitt: Bulletin of the Buffalo society of natural sciences, vol. iii., pp. 1, 2), so named by an error, and which will be redescribed as Eurypterus scorpionis in the forthcoming vol. v. of the society's bulletin.

The enclosed is a sketch of the youngest specimen in my possession, drawn full size: the largest I have,



indicates an animal at least three feet long. There cannot be any doubt as to its zoölogical position; for the characteristics of the genus Eurypterus — eyes placed within the margin of the carapace, and a triangular spine as caudal appendage — can be distinctly identified.

All my specimens have been found in the water-lime group at Buffalo, associated with Eurypterus, Pterygotus, and Ceratiocaris. JULIUS POHLMAN.

Buffalo, N.Y., Aug. 5.